

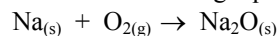
# AP Chemistry

## Gas Law Practice

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_  
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1. Given the following equation;

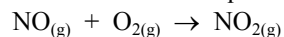


How many grams of Na are required to react with 2.5L of  $\text{O}_2$  at 755 torr and  $15^\circ\text{C}$ ?

2. An open-end manometer possesses a 20.4L reaction chamber. The complete combustion of a certain quantity of propane gas produces 13.203g of  $\text{CO}_2$  gas and 7.2064g of water vapor. If the temperature of the chamber is 353.15K and the equilibrium mercury level is 11mm higher on the reaction side of the chamber, what is the atmospheric pressure in torr?

3. A sealed flask contains a gas with pressure P. If the number of moles of the gas is doubled, the absolute temperature is doubled and the volume of the container is quadrupled, what is the new pressure in terms of P?

4. In the unbalanced equation,



If 30g each of NO and  $\text{O}_2$  are reacted to completion in a 10L sealed container at  $20^\circ\text{C}$ , what is the final pressure in the container? (NOTE: This is a limiting reagent problem!)

5. If a quantity of chlorine gas occupies 12L at STP, what volume will it need to occupy if the pressure is halved and the temperature is decreased by 30K?

6. 20g each of Helium and an unknown diatomic gas are combined in a 1500mL container. If the temperature is 298K, and the pressure inside is 86.11atm, what is the unknown gas?

7. Convert the following:

- 781mmHg to atm
- 356mmHg to kpa
- 2.3atm to torr
- $2.1 \times 10^3$ pa to atm
- 201kpa to atm

8. If 4 moles of gas are added to a container that already holds 1 mole of gas, how will the pressure change within the container?

9. A breathing mixture used by deep-sea divers contains helium, oxygen, and carbon dioxide. What is the partial pressure of oxygen at 1 atmosphere if  $P_{\text{He}} = 609.5$  mmHg,  $P_{\text{carbon dioxide}} = 0.5$  mmHg?

10. If a balloon containing 1,000L of gas at 50. C and 760 mmHg rises to an altitude where the pressure is 380 mmHg and the temperature is 10. C, what is the new volume of the balloon (in L)?

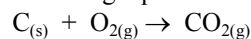
11. What is the pressure exerted by 32g of  $\text{O}_2$  in a 20-L container at  $30.0^\circ\text{C}$ ?

12. The gaseous product of a reaction is collected in a 25.0L container at  $27.0^\circ\text{C}$ . The pressure in the container is 3.0atm and the gas has a mass of 96.0g. What is the molar mass of the gas?

13. What volume of  $\text{H}_2\text{O}$  gas can be produced from 20.0g of oxygen and excess hydrogen at  $150.0^\circ\text{C}$  and .5atm?

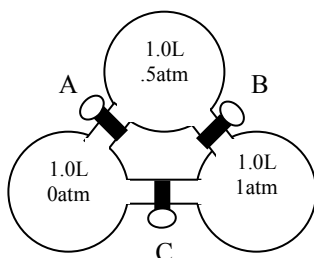
14. In an experiment, it takes an unknown gas 1.5 times longer to diffuse than the same amount of oxygen gas,  $\text{O}_2$ . Find the molar mass of the unknown gas.

15. When coke (almost pure carbon) is burned in the presence of air, the product is carbon dioxide in the following equation:



How many liters of  $\text{CO}_2$  are produced from burning enough coke to react with  $2.5 \times 10^{10} \text{ dm}^3$  of oxygen gas?

16. What will be the pressure in each container if
- just valve A is opened?
  - Just valve B is opened?
  - Just valve C is opened?
  - Any two valves are opened?



17. Determine the partial pressure of oxygen collected over water if the temperature is  $30^\circ\text{C}$  and the total pressure is 95.3 kPa.

18. Find the volume of 7.2 g of argon gas at 0.53 atm pressure and  $78.0^\circ\text{C}$ .

19. Iron(III)oxide reacts with carbon monoxide to produce iron metal and carbon dioxide. If 95.34 g of iron(III)oxide are present, how many liters of carbon monoxide, measured at  $25^\circ\text{C}$  and 1.00 atm pressure are needed to completely react with the  $\text{Fe}_2\text{O}_3$ ?

20. How many liters of  $\text{H}_{2(g)}$  measured at STP are formed from the complete reaction of 1.31 g of magnesium with hydrochloric acid? The reaction is
- $$\text{Mg}_{(s)} + 2\text{HCl}_{(aq)} \rightarrow \text{H}_{2(g)} + \text{MgCl}_{2(aq)}$$

21. Determine the density of carbon dioxide gas at STP.

22. Calculate the atmospheric pressure in kPa on a day when the barometric pressure is 753torr.

23. Calculate the pressure of a sample gas (in mmHg) inside an open-end manometer if the mercury column is 35mm higher on the side of the U-shaped tube open to the atmosphere. The atmospheric pressure is .98atm.

24. If a gas at a pressure of 250torr in a 3.5L container has its pressure increased to 455torr, what is the new volume of the container? (Assume temperature is constant).

25. What is the percent decrease in pressure if a 5.0L closed container is increased to 8.0L?